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PRAGMATICISM – THE NEW POSSIBILITY OF A SCIENTIFIC ARCHAEOLOGY AS SEEN IN THE LIGHT OF THE HISTORY OF ARCHAEOLOGY

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The article reviews the concept of scientific archaeology from the standpoint of the history of archaeology. Drawing from pragmaticist philosophy of science the article reintroduces the scientific in archaeology not so much as a methodology but as an attitude. The most obvious upshot of such methodological fragmentation will be that archaeology as an inquiry will attain a more multifaceted character. The result of adopting a scientific attitude will be a more open-ended archaeology with less emphasis on methodological purism and more insight into the complex and speculative nature of archaeological questions.

Key words: archaeological theory, epistemology, history of archaeology, philosophy, pragmaticism, realism, science, semiotics, speculation.

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Introduction

Modern archaeology is a science that, with its methods and theories, keeps constantly vacillating between natural sciences and humanities. Archaeology, it can be argued, still has not found its niche in the sciences. Archaeology has been seeking for its scientific justification from the natural sciences, especially geology and physics, and from the humanities, anthropology, literature studies, linguistics, and sociology for example. The topic has been dealt with extensively in archaeology but the problem persists, especially when examining the relationship between scientific archaeology and alternative ways of experiencing the past.

In this article, I will, on the one hand, draw a brief history of archaeology and discuss the ways archaeology has been striving to become scientific. I will be concentrating on an era when archaeology has already been established as a modern science, not just a bunch of methods borrowed from other fields of science. My goal on the one hand is to evaluate the relationship between archaeology and other sciences as whole disciplines (namely semiotics and natural sciences in general), not so much the dialogue between particular scholars, although I will also refer to such cases. I will discuss the history of archaeology by concentrating mainly on its aspirations of becoming a science during the last 30 years or so. The brief history I provide is by no means a complete one. It is not my intention to provide a complete history of archaeology as there are many textbooks where one can be found (see, e.g., Daniel 1975; Johnson 1999; Trigger 2006; Lucas 2012). My intention is

to provide a background with which the ideas of a new scientific archaeology provided toward the end of the article can be contrasted.

That having been said, I will also be concentrating on (1) identifying the reasons archaeology suffered a loss of credibility as a science, (2) how and why philosophy of science became an important question again during the last ten years or so as a result of the so-called speculative turn in continental philosophy (Bryant *et al.* 2011) and the revived interest in pragmatist semiotics, and (3) what the future of scientific archaeology might look like and what are some of the key tenets of a scientific attitude in archaeology. In this respect I will be referring to the pragmaticist philosophy of science as formulated by the American semiotician and philosopher Charles Peirce (1839–1914) during the end of the 19th century and the beginning of the 20th century.

Archaeology as a modern phenomenon and a natural science

Scientific archaeology is a modern phenomenon that can be seen to have born in a modern social and philosophical atmosphere (Thomas 2004a; 2004b, 17; Lucas 2004, 109; Holtorf 2010, 10). Modernism, on the other hand, is characterised by an increase in land use caused by industrialisation, which in turn caused an increase in archaeological finds; the wealthy land owning segment of the population started to collect antiquities and archaeology became a typologising science (Crawford 1932 in Daniel 1975, 53).

Archaeology as a science can be seen to have gotten its inspiration on the one hand from natural sciences starting as early as the latter part of the 19th century when the history of mankind was, using the methodology borrowed from geology, proven to be much longer than that depicted in the Bible (e.g. Renfrew & Bahn 2004, 26; Gamble & Kruszynski 2009). In addition to this, modern archaeology can be seen to have born as a result of C. J. Thomsen's three-period system and Charles Darwin's evolutionary theory. The three-period system and typology in particular can be seen to reside at the heart of scientific archaeology, assuming a science will always need its own scientific method. Typology and the three-period system became the scientific method of a scientific archaeology (Rodden 1981, 51).

The new scientific archaeology differed from antiquarianism, 'pre-archaeology' as mere collecting of antiquities, in that its objective was to make inferences about the past by studying the artefacts. Whereas antiquarians treated the objects simply as collectibles, archaeology believed in the ability of the material to give information about the past – it just needed to be studied systematically (Schnapp 2008, 396; Thomas 2004a, 3, 157). Leo Klejn (1973, 695–696, 700) has noted that the modern condition of archaeology is particularly manifested in systems thinking and the ability of natural sciences to give all-encompassing explanations. According to Klejn, traits of systems thinking could already be seen in early cultural history, where style, type, and archaeological culture can be seen as early modes of systems. Systems thinking then later became popular in processual archaeology.

The systematic approach is one of the very modern traits of archaeology. Systematic thinking is also an integral part of modern philosophy which in turn has affected archaeological thinking greatly. The father of modern philosophy, René Descartes, aimed to create a method of systematic skepticism, in which all sensory data is to be doubted. The only certainty to be found was in the thinking subject.

Isaac Newton, on the other hand, was working on his mechanistic view of the world that would be based on a systematic view of the functions of the cosmos. In addition to this, another important trait of modernist philosophy is the tendency to postulate a final state of affairs (Thomas 2004a, 3) – how things are and how they could ultimately be (for utopias and dystopias in archaeology, see also Shanks *et al.* 2004, 75–76). Modernism is therefore also characterised by the clear rationalist idea of the separation between theory and data – a recurring theme also in archaeology.

It is therefore no coincidence that the ideal of scientific archaeology has always based on the natural sciences and positivism. When the archaeology that was inspired by geology and biology was strengthened by the discovery of radiocarbon dating, archaeologists turned to the natural sciences and physics in particular for new possibilities of objectifying the past as a neutral object of study. Natural science became a way of avoiding the kind of unreasonable acts that were made in the name of an archaeology that was inspired by nationalistic, political, and propagandist agendas.

The era of questioning archaeology as a science

Starting at the beginning of the 1960s, German archaeologists were no longer able to keep up with the theoretical and methodological discussion that emerged in the United States. The so-called 'New Archaeology', born in the USA, had reached Europe via Great Britain (Härke 1991, 191). In this historical context, one interesting question deals with the relationship between Finnish and German archaeology. The Finnish school system was, excluding the most recent 50 years, inspired by the German school system. The Holocaust was also in this sense a great separator that led to the spreading of American culture, including American science, to Europe. The Holocaust is often said to have ended the modern period and started the postmodern era (Eaglestone 2001, 7 in Thomas 2004a, 50), which is in turn characterised by the disappearance of the borders between science and popular culture and art, and scientists and laymen.

The postmodern condition manifests for example in the topics of books about the history and theory of archaeology. Before postmodernism, archaeology can be said to have one history (the history of archaeology), whereas during the new multivocal period, scholars wanted to stress the many approaches to history and the past and the subjective nature of knowledge and experience. 'The' history of archaeology became 'a' history of archaeology or 'histories' of archaeology. One of the goals was probably also to diminish the expert cult that was seen to hinder communication between science and popular culture. This is when popular archaeology emerged and the ability of archaeology to gain knowledge about one real past was questioned. Everyone became an archaeologist.

One practical example of an attempt to lose the gap between scientific archaeology and alternative approaches to the past is the recent change that the American Anthropological Society (AAA) made to their long term plan. The word 'science' was dropped from the agenda. Their objective earlier was "to advance anthropology as the science that studies humankind in all its aspects." Now their goal is to "advance public understanding of humankind in all its aspects." (see Normark 2010 for a take on the subject).

The binary thinking characteristic of modern thinking is obvious here. The change is also characteristic of relativist

and multivocal postmodernism. There is an epistemological problem between scientific and interpretative archaeology. There has been a hermeneutic shift in archaeology from science as an apparatus of providing explanations about the past, to science as a means of understanding the past individual. The time of this shift to contextual archaeology can be pinpointed to the 1980s. Ian Hodder's (1987) article *The contextual analysis of symbolic meanings* started the so-called contextual archaeology. The objective of archaeology went from explaining past processes as part of a natural system to understanding past people as individuals with unique motivations and intentions. Archaeology became hermeneutic and the individual was now seen as an agent and an author of text. By the same token material culture was now treated as text (more on this below).

The post-processual archaeology that emerged in the 1980s is a very postmodern phenomenon. It is characterised by a fragmentary field of science and the plentitude of theories and methods. Post-processual archaeology has been called relativistic 'anything goes' archaeology (Oestigaard 2004, 35) that is plagued by atheoretical thinking. Robert Dunnell (1992, 85–86) has identified two reasons for archaeology's failure to become scientific. The first reason was the adoption of physics as the leading ideal of science in processual archaeology. The other reason was a certain commonsensism that, according to Dunnell, was also introduced to archaeology by processualism. Archaeology has undergone 150 years of 'scientification', but not once have the term 'science' and the conditions of science been adequately described (Dunnell 1992, 75). According to Dunnell (1992, 86), the use of common sense does not advance science. He maintains that archaeology needs a theory of its own, something that has not been found yet. Dunnell really believes it is possible to find one such theory. I must disagree. But Dunnell is correct in stating that a scientific archaeology would be based on falsificationism (the idea that knowledge must be based on small hypotheses that are easy to falsify when they are found to be incorrect). Dunnell identifies common sense as being based on big hypotheses such as the idea of cultural evolution. When the idea about cultural evolution is falsified, it will break down the entire system of archaeological knowledge that is fundamentally based on the false rationalist idea of cultural evolution as somehow separate from natural evolution.

Physics, according to Dunnell (1992, 88) is also not pertinent as a leading idea of science of archaeology since archaeology is history, not natural science. This view is backed up by Glyn Daniel (1975, 310–311) when he writes that archaeology and anthropology cannot be called a natural science more than natural sciences can be called history. Even though archaeology has its roots in geology, archaeology is a humanist science the object of which is mankind and culture, not nature. Daniel thereby falls victim of the same kind of false demarcation between culture and nature as Dunnell. Because of its humanist nature, archaeology was fitted with a variety of approaches from the humanities during and after the 1980s. Particularly influential were literary studies and semiotics (more on this below).

According to Bruce Trigger (2008, 365), Glyn Daniel's historiography of archaeology favoured cultural history as an approach instead of being a cultural evolutionist. Trigger writes that, according to Daniel, without cultural history archaeology would have become object-oriented antiquarianism. It is therefore ironic that some scholars, such as Johan Normark (e.g. 2010), are taking archaeology to a more object-oriented direction. Their

goal is to pick up archaeology where the so-called symmetrical discourse left it and even more aggressively debunk some of the binaries that have been plaguing archaeological theory. These include for example such pairs as natural/cultural and material/immaterial or tangible/intangible (a notion used extensively in cultural heritage theory). Normark calls his approach posthumanocentric and neomaterialist archaeology and draws his inspiration from the philosophies of Gilles Deleuze and Manuel DeLanda. He sees no objection for combining humanities and natural sciences. Actually he does not want to make such distinctions in the first place. It is true that the historiography of archaeology has sometimes fallen victim of using too great distinctions. Labeling the use of natural scientific methods as impertinent will not help in making archaeology a science. Normark's approach is therefore a good example of an aspiration to make archaeology a science again. This approach in turn is based on realising that knowledge about the past should and must be made using various methods liberally. Let us not make the mistake of dividing science into cultures as identified by Charles Percy Snow (1998, vii–viii) who wrote already in the 1960s about the sciences having been divided into two cultures, 'the literary intellectuals' and the natural scientists. There exist two cultures also in archaeology. There are on the one hand those who believe in the natural sciences as the true scientific method, and on the other hand those who see archaeology as humanism; or processualists and post-processualists in paradigmatic terms. Both cultures share what Snow (1998, viii) called "a profound mutual suspicion and incomprehension". This is where archaeology is now. There has, however, been much discussion of what is going to be the next scientific 'paradigm' of archaeology.

The possibility of a new scientific archaeology – archaeology after text

It is not necessary to categorically distinguish between the scientific methods of the natural sciences and the non-scientific methods borrowed from humanities, but it is necessary to explicitly announce that archaeology, like any science, has an object of study. Without an object, no science would be possible. The object of study in archaeology is material culture, i.e. material objects created or left behind by man as a sign of his action during the various time periods, but also natural 'artefacts' that were present during that time.

During the last decade or so, there has been a revived interest in anthropology toward material culture. Robert Preucel (2006, 14) has noted that this trend is one of the most interesting advances in recent anthropology[1]. Even though archaeology has always been characterised as the study of material culture, there is a change to be identified that holds in it a shift in the philosophical outlook and different type of ontological and epistemological questions.

Even though the many meanings of material culture have been at the heart of archaeological study for the last thirty years, during the most recent ten years scholars have started to approach them from another ontological viewpoint – one that is not based on a clear distinction between the cultural human and the material world surrounding him. Several causes underlie this change. One of the most influential philosophical traditions to ever affect archaeology, namely continental philosophy and phenomenology, experienced what has been called the speculative turn (Bryant *et al.* 2011). The speculative turn,

[1] Preucel's background is in American anthropological archaeology. That is one reason he refers to anthropology.

as a counter term for the linguistic turn, refers to a change in continental philosophy that includes the emergence of neorealism and neomaterialism. There has been a revived interest in questions of materiality in continental philosophy, which during the 20th century was more or less saturated with the ideas of existentialism and the idea of man as an authentic individual. Neomaterialists do not want to make a clear distinction between mind and matter. The linguistic turn meant taking language as a starting point for all perception and therefore knowledge. Neomaterialists do not want to make such *a priori* assumptions about the fundamental role of language as a structure. This means that the past and its material culture has now been more or less objectified as something real and independent of the individual mind. This change in turn has led to a revived importance of ontological and epistemological questions in the study of material culture. Such archaeologists as Johan Normark (see his *Archaeological Haecceities* blog), Bjørnar Olsen (2010; 2012), Matt Edgeworth (2012), and Christopher Witmore (2012) have been influenced by speculative realism and object-oriented philosophy in particular.

Witmore's conception of objects is mostly based on the writings of such philosophers as Graham Harman and Levi Bryant. The core tenet of object-oriented philosophy is that what ultimately exists is objects. Objects can be said to share various relationships with each other. Levi Bryant (2011, 26) for example does not follow the modernist schema of relationism in which objects are thought to be defined by their relations with each other. He follows Graham Harman's object-oriented philosophy and maintains that objects are always withdrawn from relations (Bryant 2011, 26), i.e. "that objects have no direct access to one another and that each object translates other objects with which it enters into non-relational relations". Nor are all objects thought to be in relation (or non-relational relation) with each other (Bryant 2011, 68). Not everything that happens affects all objects. In this sense Bryant (2011, 68) makes a distinction between objects and their relations and maintains that the universe is not a closed system where everything affects everything. In fact, he points out that if this were the case, if objects were only constituted by their relations with each other, everything would be frozen, and nothing would move (Bryant 2011, 68). Bryant (2011, 69) then goes on to explicate his philosophy of objects by stating that "we must not say that an object has its qualities or that qualities inhere in an object, nor above all that objects are their qualities, but [...] we must say that qualities are something an object does". This is an essentially pragmatistic view of objects and one of the many points of connection that speculative realism has with classical American pragmatism. The pragmatic maxim tells us to "[c]onsider what effects, that might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object" (CP 5.402)[2].

[2] Abbreviations used in this article refer to the following edited volumes of Peirce's writings as follows:
CP 1–8 followed by the number of paragraph: *Collected Papers of Charles Sanders Peirce*, 8 volumes, volumes 1–6 eds C. Hartshorne and P. Weiss; volumes 7–8 ed. A. W. Burks. Harvard University Press, Cambridge 1931–1958.
EP 1 followed by page number: Houser & Kloesel 1992.
EP 2 followed by page number: Peirce Edition Project 1998.
NEM 1–4 followed by page number: *The New Elements of Mathematics* 1–4. Four volumes in five books. Ed. C. Eisele 1976. Hague: Mouton Publishers.
SS followed by page number: *Semiotic and Significs: The Correspondence Between Charles S.*

In addition to being shared by both speculative realists and pragmatists, the idea of an object being defined by its potential effects can also be seen in the writings of some current archaeologists. Bjørnar Olsen (2012, 212), for example, writes that a thing cannot be substituted by any other thing since things have their unique competence or affordances. Olsen seems to be supporting the view that the meaning of an object is in the possible effects it is capable of producing. This is an essentially realist definition for a thing: things, as far as they are active by their virtue of being able to act, are general. In order for us to study the possible meanings of things in the past, a certain degree of generality is needed. Particular things of the past become general by their similar affordances, or the habits of acting they involve, to use a more pragmatistic vocabulary. Certain slow-changing and all-encompassing habits, like the laws of physics, provide a common ground also for the study of the past (Marila 2014).

In addition to the object-oriented attitude, another reason archaeology may have a chance to become scientific again is the adoption of another kind of semiotics as a method of study of material culture meanings. During the last 40 years or so, archaeological semiotics has usually meant studying the archaeological record from a semiological starting point that is based on the structural semiotics of Ferdinand de Saussure. His semiotics, or semiology, holds in it the idea of language as a structure according to which all knowledge is structured. That is why the treatment of material culture as text was very popular during the 1980s and the 1990s. When post-processual archaeology hit a dead end, all semiotic approaches were labelled anthropocentric and impertinent to the study of material culture. Preucel and Bauer (2001, 87) point out that it is not semiotics where the problem lies but the use of Saussurean semiology. Saussure's semiology was very systematic (its main goal was to create a systematic method for linguistic studies) and that is one reason it was also found fruitful for a systematic scientific archaeology.

There is, however, no reason to abandon all semiotic methods as limited. Preucel and Bauer (2001, 87) suggest that a semiotics based on the philosophy of Charles Peirce should be taken as a substitute. Peirce's semiotics is not based on a dyadic relationship between the signified (object) and the signifier (sign), but on a triadic understanding of the sign as a relation between an object, a sign and the interpretant (a sign created in the process of interpreting the triadic relation). This kind of semiotics is not based on structural signification but on the idea of material objects as dynamic sources of meaning. For Saussure, the signified was a psychological object. Saussure's semiology is therefore somewhat limited and may have worked for a science that treated material culture as a structural text. The pragmatic Peircean model, however, is more suitable for an archaeology that does not take human rationale as the sole foundation for meaning. In his influential book, *Archaeological Semiotics*, Robert Preucel (2006, 247) wrote that "it is possible to show that archaeology is a pragmatic discourse constituted by meaning-making practices in the present that systematically articulate with the past meaning-making practices."

In addition to Robert Preucel, such authors as Webmoor and Witmore (2008) have provided a take on social archaeology and thing-human relations that combines elements of continental philosophy and pragmatism. Furthermore,

Peirce and Victoria Lady Welby. Ed. C. S. Hardwick & J. Cook 1977. Bloomington: Indiana University Press.

Timothy Webmoor (e.g. 2007) has written extensively on pragmatism and archaeology. In his 2007 article he argues for a pragmatic (Jamesian) epistemology of archaeology in hope for a 'mediating archaeology'. Thus Webmoor astutely identifies the possibilities of a pragmatic approach in rendering archaeology a unifying enterprise between the sciences and the humanities, as well as between archaeologists and non-archaeologists. Christopher Witmore (2012) provides an example of a somewhat pragmatist approach with his notion of pragmatology, the idea that things, events, and circumstances are real and have real effects on each other and as such provide the starting point as well as the grounds for speculation for what possible course action *could* take, what *could* happen at any given instance, or what possible relevance a thing *could* have on another thing. He does not, however, explicitly refer to any particular pragmatist philosopher. In fact the notion of pragmatology was born out of the discussion revolving around symmetrical archaeology. Witmore's pragmatology nonetheless adopts the speculative attitude that is vital for any realist archaeology. For a pragmatic approach to material agency, see Watts (2008). The above is by no means a complete listing of pragmatic approaches in archaeology, but a collection of some writings where a pragmatic approach has been adopted in regard to studying the nature of things after the so-called material turn in archaeology.

Structure of the new scientific archaeology

One of the key concepts used in this article is pragmatism, or pragmaticism as Peirce himself referred to the kind of pragmatism he advocated. Peirce wanted to distinguish his realist approach from the more constructivist and individually-oriented pragmatism of his contemporaries, namely William James, John Dewey, Josiah Royce, and F. C. S. Schiller:

> "[My] word 'pragmatism' has gained general recognition in a generalized sense that seems to argue power of growth and vitality. The famed psychologist, James, first took it up, seeing that his 'radical empiricism' substantially answered to the writer's definition of pragmatism, albeit with a certain difference in the point of view. Next, the admirably clear and brilliant thinker, Mr. Ferdinand C. S. Schiller, casting about for a more attractive name for the 'anthropomorphism' of his *Riddle of the Sphinx*, lit, in that most remarkable paper of his on *Axioms as Postulates*, upon the same designation 'pragmatism,' which in its original sense was in generic agreement with his own doctrine, for which he has since found the more appropriate specification 'humanism,' while he still retains 'pragmatism' in a somewhat wider sense. So far all went happily. But at present, the word begins to be met with occasionally in the literary journals, where it gets abused in the merciless way that words have to expect when they fall into literary clutches. Sometimes the manners of the British have effloresced in scolding at the word as ill-chosen – ill-chosen, that is, to express some meaning that it was rather designed to exclude. So then, the writer, finding his bantling 'pragmatism' so promoted, feels that it is time to kiss his child good-by and relinquish it to its higher destiny; while to serve the precise purpose of expressing the original definition, he begs to announce the birth of the word 'pragmaticism,' which is ugly enough to be safe from kidnappers." (CP 5.414.)

And:

> "the word 'pragmatism' should hereafter be used somewhat loosely to signify affiliation with Schiller, James, Dewey, Royce, and the rest of us, while the particular doctrine which I invented the word to denote, which is your first kind of pragmatism, should be called '*pragmaticism*.' The extra syllable will indicate the narrower meaning." (CP 8.205.)

The word 'pragmaticism' is therefore a neologism that is used to refer to Peirce's pragmatism particularly. When it comes to formulating a scientific archaeology according to the maxims of pragmatism, it is my view that a distinction between pragmatism and pragmaticism is a vital one and I have therefore adopted the term 'pragmaticism'.[3] Whereas both of the aforementioned parties take the importance of signs as paramount in forming all knowledge, a pragmatist would emphasise the role of an individual thinker in interpreting a sign. For a pragmatist the sign is more connected with the individual mind. A pragmaticist, on the other hand, would stress the mind-independent nature of reality as a source of interpretation. For scientific archaeology, the reality of the past is of utmost importance. But the most important distinction, however, is to be made between pragmaticists and rationalists. Pragmaticism is a method of thinking that presupposes the existence of a reality that would serve as a 'common ground' for experience, knowledge, and communication. I hope to have made clear by now what types of problems a rationalist archaeology has and what kind of trouble it would lead to.

Dunnell criticised archaeology for adopting a commonsensist attitude. It is therefore ironic that Peirce calls his pragmaticism, including the scientific method, critical commonsensism. Even though Dunnell criticised archaeology for adopting a commonsensist attitude toward studying the past, his idea of science does not differ much from that of Peirce. Dunnell was after a coherent theory of archaeology that would be based on small hypotheses. Finding a coherent theory, however, may be impossible and even uncalled for. A more realistic approach would be to look for a coherent method for conducting scientific inquiry. Even more important than his semiotics is Peirce's idea of the scientific method. In *The Fixation of Belief*, Peirce distinguishes between four methods of forming beliefs. All inquiry starts with the feeling of doubt and the object of all inquiry is the settlement of opinion (EP 1, 114–115). Once science reaches its goal of settled opinions, all doubt disappears. Beliefs thus, at the end of the hypothetical day, become fixed. The object of all inquiry is the truth which in turn is based on reaching true propositions ("if there be any such thing", NEM 3, 773), about reality. The real in this sense becomes the object of truth. Once a group of scientists dedicated to a field of study reach a settled opinion (when doubt no longer arises), the truth has been reached. Or as Peirce himself more acutely puts it, "The opinion which is fated to be ultimately agreed to by all who investigate, is what we mean by the truth, and the object represented in this opinion is the real" (CP 5.406–407).

[3] It is important to make the distinction between pragmatism and pragmaticism due to the many forms pragmatism has taken over the years of its existence. On the one hand, in archaeology, disregarding the term 'pragmatism' avoids the tedious distinction between theoretical and pragmatic archaeology. On the other hand the difference relates to that between constructivism and realism. Constructivism tends to approach certain concepts as only culturally meaningful whereas pragmaticism emphasises concepts as historically meaningful habits of acting (see, e.g., Marila 2014).

The fixation of belief (the search for truth) starts on the individual level. An individual's fixed beliefs quickly become shaken by the realization of another person's opinions having the virtue of being equal to his (EP 1, 116–117). History has shown, however, that even the most tenacious (Peirce refers to this method as the method of 'tenacity', EP 1, 116) of individuals have ultimately had to alter their opinions once regarded as true. This is why a method of finding out the truth will not be based on individual research, but on that of a community (EP 1, 117). Such a method, the method of 'authority' (EP 1, 117), however, even though it has throughout the history been one of the most influential methods of upholding correct political doctrines for instance and led to great achievements, would ultimately lead to horrible atrocities. The method of authority will lead to a very slow change in beliefs and make the individual beliefs seem as fixed. It is a doctrine fit for masses (EP 1, 116–118).

A slow change rate would not, however, keep the most astute of individuals from figuring out that some men have, perhaps in a distant past, had ideas that differ very much from those of his. This will give rise to doubt in their mind. This method could be called the *a priori* method of reason (EP 1, 119). The *a priori* method, however, is nothing but a form of the authoritative method based on individual beliefs that have no real and mind-independent basis, just as the method of authority is based on ideas originating from within a community of thinkers.

We hereby arrive at the fourth method that Peirce calls the *scientific* method (EP 1, 121). The scientific method is based on the idea of a mind-independent reality that similarly affects all individuals' thinking. For any belief to be true, it must rest on some **'external permanency', some**thing our thinking has no effect upon (EP 1, 120). Again, Peirce (CP 5.384) puts it very eloquently:

> "There are Real things, whose characters are entirely independent of our opinions about them; those Reals affect our senses according to regular laws, and, though our sensations are as different as are our relations to the objects, yet, by taking advantage of the laws of perception, we can ascertain by reasoning how things really and truly are; and any man, if he have sufficient experience and he reason enough about it, will be led to the one True conclusion."

And in referring to the mind-independent universe as 'common ground' Peirce (CP 3.621) writes that:

> "The universe must be well known and mutually known to be known and agreed to exist, in some sense, between speaker and hearer, between the mind as appealing to its own further consideration and the mind as so appealed to, or there can be no communication, or 'common ground,' at all. The universe is, thus, not a mere concept, but is the most real of experiences."

Such are the methods of fixing beliefs. The scientific method, then, as the only of the four "which presents any distinction of a right and a wrong way" (EP 1, 121), is worth taking a closer look at. Before I go into this in any more detail, I have to point out one more thing. Peirce (CP 6.428) notes that the scientific method is not science itself but an outcome of science:

> "That which constitutes science [...] is not so much correct conclusions, as it is a correct method. But the method of science is itself a scientific result. It did not spring out of the brain of a beginner: it was a historic attainment and a

> scientific achievement. So that not even this method ought to be regarded as essential to the beginnings of science. That which is essential, however, is the scientific spirit, which is determined not to rest satisfied with existing opinions, but to press on to the real truth of nature."

According to Peirce, "all human knowledge, up to the highest flights of science, is but the development of our inborn animal instincts" (CP 2.754). Because the processes of thought and nature are alike (CP 3.422), "the human mind is akin to the truth" (CP 7.220). The role of instinct and guessing has not often been taken seriously in science. This hypothesis, however, seems very natural once we abandon the false idea of man being somehow independent of nature and its laws. Like Peirce stated above, what constitutes science is not the correct conclusions it may ultimately arrive at but a correct method. On occasion, however, Peirce (e.g. CP 1.43–45) refers to pragmaticism as an attitude, not as a method. It is therefore customary to see pragmaticism, as formulated by Peirce, not as a scientific method but as a scientific attitude even today.

It is now perhaps time to present the basic tenets of a scientific archaeology according to this scientific attitude. These key concepts are what I think constitute a scientific approach most suitable for a realist approach to archaeology. These themes have been to some extent discussed above but I will now support them by citing Peirce's exact words more.

1. Fallibilism and meliorism

> "All positive reasoning is of the nature of judging the proportion of something in a whole collection by the proportion found in a sample. Accordingly, there are three things to which we can never hope to attain by reasoning, namely, absolute certainty, absolute exactitude, absolute universality. We cannot be absolutely certain that our conclusions are even approximately true; for the sample may be utterly unlike the unsampled part of the collection. We cannot pretend to be even probably exact; because the sample consists of but a finite number of instances and only admits special values of the proportion sought." (CP 1.141.)

By positive reasoning, Peirce refers to the idea that our knowledge has a positive relationship with what is real. Again, I refer to Peirce's idea of a common ground that makes all scientific inquiry and communication relevant. Regardless of the assumption that philosophy and archaeology are positive sciences, we as scientists must "not block the way of inquiry" (CP 1.135) by tenaciously clinging to strands of knowledge we may regard as true. Nor is it reasonable to expect all knowledge to be false. That would lead to rationalism and skepticism which are unintelligible outlooks. It is just beneficial not to build knowledge upon *a priori* facts (although scientists should avoid dogmatism) but by the same token it would be foolish to categorically doubt all of our senses. People do err, but, since, according to what has been discussed above about our ability to guess correctly (and learn), we are probably right more often than not.[4]

[4] It is worth noticing that Peirce's idea of fallibilism predates Karl Popper's works on falsificationism, which I will leave out of this paper for economical reasons. It is clear that Popper did study Peirce's philosophy and shared for example Peirce's ideas about indeterminacy and chance (Popper 1979, 215). In his essay *Of Clouds and Clocks*, Popper (1979, 212–213) speaks highly of Peirce, calling him one of the greatest philosophers of all time.

"[F]allibilism is the doctrine that our knowledge is never absolute but always swims, as it were, in a continuum of uncertainty and of indeterminacy. Now the doctrine of continuity is that *all things* so swim in continua." (CP 1.171.)

"Evolution means nothing but *growth* in the widest sense of that word. Reproduction, of course, is merely one of the incidents of growth. And what is growth? Not mere increase. [...] But think what an astonishing idea this of *diversification* is! Is there such thing in nature as increase of variety? Were things simpler, was variety less in the original nebula from which the solar system is supposed to have grown than it is now when the land and sea swarms with animal and vegetable forms with their intricate anatomies and still more wonderful economies? It would seem as if there were an increase in variety, would it not?" (CP 1.174.)

"Once you have embraced the principle of continuity no kind of explanation of things will satisfy you except that they grew. The infallibilist naturally thinks that everything always was substantially as it is now. Laws at any rate being absolute could not grow. They either always were, or they sprang instantaneously into being by a sudden fiat like the drill of a company of soldiers. This makes the laws of nature absolutely blind and inexplicable. Their why and wherefore can't be asked. This absolutely blocks the road of inquiry. The fallibilist won't do this. He asks may these *forces* of nature not be somehow amenable to reason? May they not have naturally grown up? After all, there is no reason to think they are absolute. If all things are continuous, the universe must be undergoing a continuous growth from non-existence to existence. There is no difficulty in conceiving existence as a matter of degree. The reality of things consists in their persistent forcing themselves upon our recognition. If a thing has no such persistence, it is a mere dream. Reality, then, is persistence, is regularity. In the original chaos, where there was no regularity, there was no existence. It was all a confused dream. This we may suppose was in the infinitely distant past. But as things are getting more regular, more persistent, they are getting less dreamy and more real." (CP 1.175.)

Because of their ability to form positive knowledge, people are able to evolve and gain more knowledge, in a sense get better at doing things. This is an important argument also for the ability of scientific archaeology to know more about the past than the alternative approaches to studying the past. Success, however, is only possible if we work to achieve it. Such outlook has been referred to as 'meliorism'. It can be described as an idea about the world that does not take it as the best nor the worst possible, but that it certainly is capable of improvement. Although Peirce does not use the term 'meliorism' often, it can be linked to his ideas about ethics; the question of what end is possible. Science therefore should be ethical in its attempt to work toward the most 'admirable end':

> "Ethics, or the science of right and wrong, must appeal to Esthetics for aid in determining the *summum bonum*. It is the theory of self-controlled, or deliberate, conduct." (CP 1.191.)

2. The structure of scientific inquiry

The following ideas have also been explicated to some degree above but they deserve more attention. The structure of scientific inquiry follows the basic rules of

scientific attitude, for example that sham reasoning is to be avoided (CP 1.57), as presented above. Some ideas, however, are very important. These include the processes of inference, for example.

In addition to the traditional forms of inference (induction and deduction), Peirce formulated a third kind of inference, one he called abduction. Abductive reasoning is the basis for all processes of forming archaeological knowledge and it is often connected to cases where a surprising fact requires an explanation (EP 2, 287). In archaeology, abduction can often be characterised as inference to the best explanation, i.e. what explanation serves as the best one for a given set of observed facts. The relevance of abductive reasoning in crime scene investigation or Sherlock Holmes-type detective work has often been stressed in philosophical texts (e.g. Eco & Sebeok 1983). Abductive inference is therefore very important also in archaeology which has been said to resemble the aforementioned sciences very closely (e.g. Klejn 2001, 31, 38–41, 128). The role of abductive reasoning in archaeology has nevertheless been studied very little. Some of the rare exceptions include Leo Klejn's (2001, 128) view of the abductive nature of archaeological knowledge, Cameron Shelley's writings about visual abduction in archaeology (e.g. Shelley 1996), and some rare references to abduction as inference to the best explanation that were carried out as part of the processual discourse (Hanen & Kelley 1995 (1989)).[5]

All science is, or should ultimately be, based on similar processes of reasoning. According to the later writings of Charles Peirce, abduction, a weak mode of inference, can be characterised as a guessing instinct for finding good hypotheses similar to that of the animals' instinct for doing things that are beneficial or necessary for their survival that has developed during hundreds of thousands of years of evolution (Paavola 2005, 131–132). To back this up, Peirce argues that it would have been virtually impossible for humans to have developed and reached the current state of knowledge if reasoning was based on mere guessing. In this sense the human mind is, as I already stated above, "akin to the truth" (CP 7.220). Abduction is the first phase of inquiry with which ideas and hypotheses are generated. Induction (together with abduction, of course, and to some degree also deduction) are then used to test new ideas and hypotheses (CP 6.526–536). When the basis of knowledge is understood in this fashion, there is little room for arguing in favour of a theory of semantic logic as the grounds and boundaries of knowledge as has been the case traditionally in processual archaeology with its fixation with covering law models and the hypothetic-deductive model.

According to Peirce's own words, abduction

> "consists in examining a mass of facts and in allowing these facts to suggest a theory. In this way we gain new ideas; but there is no force in the reasoning. [...] [I]nduction is, as Aristotle says, the inference of the truth of the major premiss of a syllogism of which the minor premiss is made to be true and the conclusion is found to be true, while abduction is the inference of the truth of the minor premiss of a syllogism of which the major premiss is selected as known already to be true while the conclusion is found to be true. Abduction furnishes all our ideas concerning real things, beyond what are given in perception, but is mere conjecture, without probative force." (CP 8.209.)

[5] For a more recent take on abduction in archaeology, see Marila 2013.

"Abduction is the process of forming an explanatory hypothesis. It is the only logical operation which introduces any new idea; for induction does nothing but determine a value, and deduction merely evolves the necessary consequences of a pure hypothesis.

Deduction proves that something *must* be; Induction shows that something *actually* is operative; Abduction merely suggests that something *may be*.

Its only justification is that from its suggestion deduction can draw a prediction which can be tested by induction, and that, if we are ever to learn anything or to understand phenomena at all, it must be by abduction that this is to be brought about.

No reason whatsoever can be given for it, as far as I can discover; and it needs no reason, since it merely offers suggestions." (CP 5.171.)

Such is the case with much of archaeological knowledge which is often based on very fragmentary, although massive, evidence of past action. Archaeological hypotheses, or sometimes more like guesses, something Peirce (CP 6.526) calls 'abductory inductions', that are formed on the basis of that fragmentary record can then be tested with induction (testing of hypotheses by means of prediction), i.e. whether future occurrences of similar facts in the archaeological record fit in the picture. In effect, integrating abduction in the process of archaeological inquiry as the third (or fundamental) and explanatory element of inference renders archaeology an explanatory science rather than a descriptive activity.[6]

3. The final opinion and the long run

The accumulation of knowledge is based on an understanding of interpretation as a mediative sign creation process. Peirce's view of sign is based on a tripartite structure of relations between three sign components. A sign is composed of the sign-vehicle (or representamen), object, and the interpretant.[7] All genuine signs are composed of these three inseparable parts. The process of interpreting a sign will create another sign which in turn becomes interpreted, thus creating another sign in the process. This chain of sign creation Peirce called *semiosis* (EP 2, 411). The accumulation of knowledge can be widely understood as semiosis or sign activity and would continue as long as any sign becomes interpreted. It is therefore important to understand that interpretation (and all archaeological inquiry) is a diachronic process that ultimately transcends the individual. Here is what Peirce writes about the sign and the process of interpretation:

"A Sign is a Cognizable that, on the one hand, is so determined (i.e., specialized, *bestimmt*) by something *other than itself*, called its Object [...], while, on the other hand, it so determines some actual or potential Mind, the determination whereof I term the Interpretant created by the Sign, that that Interpreting Mind is therein determined mediately by the Object." (EP 2, 492.)

"A sign, or *representamen*, is something which stands to somebody for something in some respect or capacity. It addresses somebody, that is, creates in the mind of that person an equivalent sign, or perhaps a more developed sign. That

[6] See Bradley 2009 for a take on pragmaticism as an explanatorist enterprise.

[7] See Preucel 2006 for a concise summary of Peircean semiotics in archaeology.

sign which it creates I call the *interpretant* of the first sign. The sign stands for something, its *object*. It stands for that object, not in all respects, but in reference to a sort of idea, which I have sometimes called the *ground* of the representamen. 'Idea' is here to be understood in a sort of Platonic sense, very familiar in everyday talk [...]." (CP 2.228.)

"suppose I awake in the morning before my wife, and that afterwards she wakes up and inquires, 'What sort of a day is it?' *This* is a sign, whose Object, as expressed, is the weather at that time, but whose Dynamical Object is the *impression which I have presumably derived from peeping between the window-curtains*. Whose Interpretant, as expressed, is the quality of the weather, but whose Dynamical Interpretant, is *my answering her question*. But beyond that, there is a third Interpretant. The *Immediate Interpretant* is what the Question expresses, all that it immediately expresses, which I have imperfectly restated above. The *Dynamical Interpretant* is the actual effect that it has upon me, its interpreter. But the Significance of it, the *Ultimate*, or *Final*, *Interpretant* is her *purpose* in asking it, what effect its answer will have as to her plans for the ensuing day. I reply, let us suppose: 'It is a stormy day.' Here is another sign. Its *Immediate Object* is the notion of the present weather so far as this is common to her mind and mine – not the *character* of it, but the *identity* of it. The *Dynamical Object* is the *identity* of the actual or Real meteorological conditions at the moment. The Immediate Interpretant is the schema in her imagination, i.e. the vague Image or what there is in common to the different Images of a stormy day. The *Dynamical Interpretant* is the disappointment or whatever actual effect it at once has upon her. The *Final Interpretant* is the sum of the *Lessons* of the reply, Moral, Scientific, etc. Now it is easy to see that my attempt to draw this three-way, **'trivialis' distinction, re**lates to a real and important three-way distinction, and yet that it is quite hazy and needs a vast deal of study before it is rendered perfect." (CP 8.314.)

"We must also note that there is certainly a third kind of Interpretant, which I call the Final Interpretant, because it is that which *would* finally be decided to be the true interpretation if consideration of the matter were carried so far that an ultimate opinion were reached." (EP 2, 496.)

Since there is a real world around us, we can, as a scientific community, reach agreement as to its nature. As I have already stated above, the object of scientific inquiry is the truth. It is worthy of more attention what Peirce has to say about it:

"I call 'truth' the predestinate opinion, by which I ought to have meant that which *would* ultimately prevail if investigation were carried sufficiently far in that particular direction." (EP 2, 457.)

"Truth is a character which attaches to an abstract proposition, such as a person might utter." (CP 5.565–566.)

"To say that a proposition is true is to say that every interpretation of it is true." (CP 5.569.)

The propositional truth[8], then, as more or less synonymous to the final opinion,

[8] **It should be noted that with the pragmaticis**tic notion of truth as something that would be arrived at if inquiry were pursued indefinitely, we are reintroducing the idea of truth in philosophy of science also on a more common

should be distinguished from reality as real, which, again, is the object of truth:

> "That which is such that something true about it is either true independently of the thought of any *definite* mind or minds or is at least true independently of what any person or any definite individual group of persons think about that truth, is real." (SS 117.)

If scientific inquiry (a conduct according to the tenets of a scientific attitude) were pursued long enough, the truth would be reached. Such an opinion would be the final one; it would lead to the disappearance of a desire caused by the need to find out the truth. All doubt, and ultimately all movement of the mind, would cease. One of the malaises of (post) modern science is the tendency to reduce truth to the individual level. A solipsist easily arrives at the assumption that her knowledge is the only interpretation of reality. This idea has led to a more or less general acceptance of the post-processual proverb that the past cannot be reached and known to any degree of certainty. The idea of truth as something that can be reached in the long run should not be taken as a confirmation of an inevitable arrival at true propositions but as the possibility to find answers to questions. For if it were not for our faith in finding out the truth, why should we ever doubt anything in the first place? The conduct of any scientific inquiry is, however, painfully slow and hard. We may never know for example what a particular material object may have meant to past people (some information will probably inevitably remain 'buried secrets'), but we must keep doing our best to do so. Matthew Johnson (1999, 114) puts it well: "[A]rchaeology is very difficult." Archaeologists must therefore be patient. Forming archaeological knowledge takes a long time, longer than that of an individual thinker's lifespan.

Synthesis

In this article, I have suggested that archaeologists, in place of methodological rigorism, adopt a scientific 'attitude'. Three main tenets inspired by pragmaticist philosophy of science remain at the heart of such scientific archaeology:

1. Archaeologists, like all scientists, are fallible and often wrong. Our interpretations and explanations regarding the archaeological material record are unlikely absolutely correct, but at least, more often than not.
2. Our hypotheses seem to be the best explanations, given that we are well acquainted with the material and follow some basic guidelines of ethical scientific conduct.
3. As there is a line of reasoning running throughout all of the history of archaeology, it would appear that archaeologists really do get better at forming hypotheses. This in turn would suggest that knowledge is accumulative. But then again, archaeologists, like all

level. For Kuhn (1964), for example, the idea of truth was not that important. This has been the case also in post-processual archaeology in general, where, instead of searching for the past as it once happened, many archaeologists were more interested in reconstructing the past according to the multitude of interpretations of it. Today, the idea of truth is also evident in current continental philosophy and metaphysics for example in the works of Alain Badiou (2003), for whom truth can be reached by adopting a mathematical methodology. Mathematics for Badiou has to replace the structuralist or analytical notion of philosophy as language. In fact mathematics, according to Badiou (2003, 183) as the only rational way of dealing with infinity, has to replace metaphysics as it is known today in general.

scientist, are fallible. This takes us back to number one on my list.

In this article, I am not suggesting the emergence of a new scientific paradigm. Because I do not believe there has ever been a true paradigmatic shift in archaeology in the Kuhnian (1964) sense, the new pragmaticistic archaeology should be understood as a synthesis between processual archaeology and post-processual archaeology – a new scientific attitude and the new possibility of a scientific archaeology. I may even be suggesting something that has always been taken for granted, or been obvious, in archaeology, but I hope to have shifted the focus to a 'common ground' between all approaches in the history of scientific archaeology. In retrospect it can be noted about archaeology in general that it has always admirably used different approaches and methods from different sciences. They have not always been the most pertinent and often even outdated (Bintliff 1991, 2). According to Preucel and Mrozowski (2010, 33), who also strive for a pragmatistic archaeology, studying the past is based on a science that is diverse in methods, as well as epistemology. When it comes to theories and methodology, the disunity of science need be seen as its strength, not as its weakness. Pragmaticistic archaeology will seek answers to the same questions that have always been the moving force in the conduct of all archaeological inquiry. Its approach may just differ from some of the preceding discourses, particularly from those most liberal and multivocal in their philosophies.

Pragmaticistic archaeology is a combination of certain methods from the systematic natural sciences as well as humanities, mainly Peircean semiotics (Preucel & Mrozowski 2010, 32). It is courage to propose small questions, and courage to occasionally err and still have faith in science. It is motivated by the melioristic idea of the accumulation of knowledge, however painfully slow it may seem. This is to imply that pragmaticism is a work in process. It is an attitude, not a scientific method. In addition to the two cultures, natural science and humanities, as proposed by Snow, semiotics as a whole can be seen as a third culture that seeks to bridge the gap between the two discourses. In fact, a semiotician would not make that distinction in the first place. Pragmaticism is the kind of philosophy that all science should start from. One of the reasons the two cultures emerged in the first place is that for hundreds of years philosophy was based on a rationalist approach that only took any rational (mind-dependent) proposition as relevant. The empirical world did not matter. Semiotics, as described by Peirce, is based on the idea of a mind-independent real world. A philosophy that denies the importance of experience and perception is a philosophy that does not deal with the real and knowable world. A pragmaticistic semiotics, however, is an e m p i r i c a l l y s e n s i t i v e philosophy. One reason is probably the fact that many of the first real pragmatists were scientists. William James was a physician and a psychologist, Peirce was a chemist and a geodesist. By the same token, if a philosopher should not disregard the achievements of other sciences, nor should any scientist remain unaware of the advances in philosophy. The research problems of two seemingly different sciences often seem to be divided by such a vast territory that it makes them seem unrelated. A closer inspection and a mature investigation usually proves that this is not the case:

> "In the Roman schools, grammar, logic, and rhetoric were felt to be akin and to make up a rounded whole called the trivium. This feeling was just; for the three essential branches of semeiotics,

of which the first, called speculative grammar by Duns Scotus, studies the ways in which an object can be a sign; the second, the leading part of logic, best termed speculative critic, studies the ways in which a sign can be related to the object independent of it that it represents; while the third is the speculative rhetoric." (EP 2, 326–327.)

"The point of view just explained enables us to perceive that a particular branch of science, such as Physical Chemistry or Mediterranean Archeology, is no mere word, manufactured by the arbitrary definition of some academic pedant, but is a real object, being the very concrete life of a social group constituted by real facts of inter-relation, – as real an object as a human carcase, which is made one by the inter-relations of its millions of cells." (CP 7.52.)

Mark Pearce (2011) has pointed out that archaeology is not heading toward another paradigmatic shift, but archaeologists are realising that good science is flexible and does not let theoretical standpoints to hinder its advancement. That is why theory, according to Pearce (2011, 87) in archaeology has become *bricolage*, a more pragmatic and more open archaeology that mixes methods according to the research question at hand. Pearce is correct in stating this, but he does not take into account some of the profound philosophical presuppositions between certain archaeological paradigms. In fact, he states that theoretical positions are not necessarily as different as they may appear. What Pearce fails to notice, however, is that a relativist or a structuralist archaeology and a positivist, naturalistically oriented archaeology for instance rest on totally different, and incompatible, philosophies. A poststructuralist archaeologist may base his archaeology on the idea of meaning as something internal to the mind, whereas a naturalist or a pragmaticist archaeologist has to necessarily take meaning as something that is not restricted to the mere rational operations of an individual mind but is the result of sensible interaction between objects. Pearce is therefore not correct in his statement that archaeologists could adopt a pragmatic (not a reference to philosophical pragmatism) attitude toward studying the past from any theoretical vantage point they see as the most suitable, regardless of the level of interpretation. There are some profound philosophical issues that have to be taken into account when doing science. Not all methods are equal in this sense, and archaeology may not be able to adopt the eclectic attitude that Pearce suggests. A basic scientific philosophical attitude, however, has to be taken as a starting point for doing scientific archaeology. As an attitude of doing science, pragmaticism aims at overcoming the divisions that have been made in archaeology in regard to theory and methodology. Pragmaticism is therefore a third culture (in addition, or rather replacing the two identified by Snow) that aims at unifying science and the humanities by realising that there are certain processes of knowledge formation that are common to all sciences, and all inquiry in general, regardless of the applied methodology.

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